Comment number	Comments	Responses

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365
November 4, 1983

4PM-EA/GM

Mr. M. J. Sires, III
Assistant Manager for Health,
Safety and Environment
U.S. Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, S.C. 29801

Dear Mr. Sires:

In accordance with Section 309 of the Clean Air Act and the National Environmental Policy Act, the Environmental Protection Agency has reviewed the Draft Environmental Impact Statement, and appendices, on the proposed resumption of L-Reactor operation at the Savannah River Plant (Barnwell County) South Carolina. Our evaluation reveals that there are a number of significant environmental issues resulting from this action which remain unresolved or are still under study in an effort to effect mitigation. The major issues are groundwater contamination associated with certain of the reactor's support facilities, discharge of heated effluent into Steel Creek which will result in the destruction of extensive wetlands within the creek and its delta with the Savannah River, and uncertainty involving the treatment and disposal of various potential and actual hazardous wastes generated from reactor operations.

The enclosed comments address all the issues which we have determined or suggest require additional assessment in the Final EIS. Nevertheless, the information in the document, coupled with our extensive dialogue with your staff members and this agency's long-term association with the Savannah River Plant,

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	allow us to make a reasoned decision on the proposal's overall environmental acceptability. On the basis of the outstanding water quality issues, a rating of EU-2 was assigned. That is, we have determined important ground and surface water impacts resulting from the facility's operation will be environmentally unsatisfactory in its currently proposed design in that the document does not provide sufficient information regarding the corrective measures that will be employed to avoid adverse environmental impacts. We know that the DOE is presently working on developing these measures, in cooperation with the regulatory agencies. We believe that much of the additional information that we have requested is already available to you and should be included in the Final EIS. If we can be of any assistance to you on this matter or you wish to discuss any of our observations/suggestions, Howard D. Zeller (FTS 257-3476) will serve as our point of contact. Sincerely yours, Charles R. Jeter Regional Administrator Enclosure	

Table M-2. DOE responses to comments on Draft EIS (continued)

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	L-REACTOR SAVANNAH RIVER PLANT GENERAL OBSERVATIONS AND SPECIFIC COMMENTS	
DA-1	o The Draft EIS describes the major environmental effects of the project. However, the final EIS could be improved by the inclusion of a more complete description of the deficiencies in the present reactor and attendant support system, and indicating what will be done to correct these conditions. A survey of the projected improvements and new items required for the overall facility to meet air and water quality standards reveals the shortcomings of the present system. It also reveals certain of the cleanup items that are necessary to meet requirements of the Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response Compensation and Liability Act (CERCLA), or DOE equivalent standards. o Most of the improvements necessary to meet the desired standards are adequately described in Chapter 5, "Incremental, and Cumulative Impacts from L-Reactor Operation." However, we suggest that they be summarized in the first chapter, "Summary." Individual detailed coverage could then be given under "Environmental Consequences" in each of the chapters covering items which need mitigation or improvement. The major items in this regard involve addressing surface water discharges of certain contaminants, mitigation of thermal discharges, and better techniques for handling of hazardous materials. A clean-up/monitoring plan, to assess the present zone of contamination, is of special interest. Particular care must also be taken in regard to potential/actual groundwater supplies in those areas already determined to be contaminated or anticipated to become so. o The Draft EIS contains a summary of projects which are being planned or are underway to correct the major deficiencies noted above. These facilities/cleanup measures are vital to any restart effort since they are necessary for the safe operation of the plant and subsequent attainment of air and water quality standards. This should be made clear in the Final EIS.	All applicable Federal and state requirements for air and water quality will be met by L-Reactor, including NPDES permit conditions. In this final EIS, an expanded discussion of cooling-water mitigation alternatives and the SRP groundwater protection and remdial action programs have been included. Pursuant to the suggestions contained in these comments, the summary to Volume I of this EIS identifies the mitigative actions to be taken by DOE, as well as the commitments with respect to other environmental protection programs.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-2	o The Draft EIS fails to address the impact on the groundwater system from the increase in effluent and waste volumes which will be generated at supporting facilities when the L-Reactor restarts. The report does state (Table 2-2) that there will be a 33% increase in effluent volume at the Fuel Fabrication Facility and at the Chemical Processing Facility, together with a 33% increase in waste volume to the Waste Management Facility. Yet, the Draft EIS omits any further discussion of the implications of the increased volume on the planned remedial actions. It also fails to develop alternative strategies to deal with the additional material. Development of alternatives to deal with this issue was one of the essential suggestions EPA made in its previous coordination efforts on this facility. These options need to be included in the Final FIS.	The EIS contains discussions of potential impacts to the ground waters beneath the SRP from the operation of L-Reactor and its support facilities (Sections 4.1.1.3, 4.1.2.2, 4.3.3, 5.1.1.2, and 5.1.1.4). These sections have been expanded to provide a more thorough discussion of groundwater impacts. As noted in the EIS, *the incremental impacts to the shallow aquifers beneath* the central shops, burial ground, and M-, F-, H-, and K-Area basins, and impacts beneath L-Area are expected to be minor. Alternatives to the use of the L-Reactor seepage basin are discussed in Section 4.4.3. Use of seepage basins elsewhere on SRP and the use of the SRP burial ground are all being evaluated on a sitewide basis. These facilities were used when L- and R-Reactors were operating. The incremental effects of L-Reactor operation are not likely to appreciably affect planned remedial actions. Alternative strategies to deal with the incremental releases of liquid wastewater and low-level radioactive wastes are discussed in the "SRP Ground-Water Protection Implementation Plan." This plan has been reviewed by the State of South Carolina and EPA and is currently being revised based on their comments. This plan will be the subject of a separate NEPA review (Section F.6). The DOE's commitment to the protection of ground-water quality are discussed below. As noted in the opening remarks to the public hearings on the L-Reactor DEIS, the DOE is committed to (1) an expanded program of sitewide ground-water monitoring and study; (2) the involvement of the State of South Carolina in onsite and offsite ground-water monitoring activities; and (3) mitigative actions at SRP to reduce pollutants released to the ground water as needed. Additional details are provided in Sections 6.1.6 and F.6 of this EIS. Current plans call for discontinuing the use of the M-Area seepage basin before April 1985 and operating a process wastewater-treatment facility at that time. Based on Congressional authorization and approval of a FY 1986 funding request, DOE plans to operate an effluent treatment facility by October 1988 to process wastewater and discontinue the use of the F- and H-Area seepage basins (Section 5.1.1.2).

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DA-3	o According to DOE's "Groundwater Protection Implementation Plan," the proposed restart comes at a critical stage in the management of SRP's groundwater problem. Three facilities, Fuel Fabrications, Chemical Processing and Waste Management, are scheduled for decommissioning in the near future since they have been responsible for significant groundwater contamination.	As mentioned in response to comment DA-2, the "SRP Ground-Water Protection Implementation Plan" was recently developed to examine strategies and schedules to implement mitigative actions required to protect the quality of the groundwaters beneath SRP. Implementation of mitigative actions would be accomplished under DOE's Resource Conservation and Recovery Act requirements, and would be compatible with the State of South Carolina's hazardous waste management requirements. The small incremental discharges due to L-Reactor restart will be accounted for in the design of effluent treatment facilities that will replace existing seepage basins. The sitewide ground-water protection plan will be the subject of a separate NEPA review (Section F.6). This NEPA review on the ground-water protection plan will cover such topics as seepage basin decommissioning, cleanup levels, costs and schedules, and need for institutional controls.
DA-4	To comply with the Congressional mandate, the Fuel Fabrication Facility basin will be closed out by June 1985. At that time, wastewater will be routed to a wastewater treatment unit. At present, the seepage basin which receives effluent from the Fuel Fabrication Area is impermeable to downward percolation. This results in effluent overflows in a southwesterly direction to a lake down gradient. Severe contamination in the upper aquifer poses an imminent threat to a deeper aquifer that supplies drinking water to plant employees and off-site communities. Even though this could only be a short-term situation, the potential health and safety implications should be addressed in the Final EIS.	Pollutants, principally chlorinated hydrocarbons used as degreasers, that were released to the M-Area basin, leaked from the process sewer, and spilled from the M-Area solvent tank in the early 1960's, have migrated into the Tertiary sediments. This contamination is discussed in Sections 5.1.1.2. The sewer line to Tims Branch no longer receives process wastewater and the line to the M-Area basin has been repaired; discharges to the M-Area basin will be discontinued by April 1985. Although seepage basins have been in service at SRP since the mid-1950s, drinking water from the Tuscaloosa wells in the central portion of the SRP does not appear to be contaminated by radionuclides or chlorinated hydrocarbons. However, in 1983, two wells producing from the Tuscaloosa in A-Area were found to have low concentrations of chlorinated hydrocarbons; concentrations in water samples from these wells ranged from less than 3 to less than 27 micrograms per liter. Based on recent investigations by Geraghty & Miller (1983) the following findings have been made with respect to the entry of chlorinated hydrocarbons into the Tuscaloosa Aquifer: "The presence of trichloroethylene in well 53-A indicates that contaminants most likely are migrating from the shallower Tertiary zone downward along the outside of the well

Table M-2. DOE responses to comments on Draft EIS (continued)

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		casing into the gravel pack outside of the well screen section. The contaminants appear to enter the well in the upper part of the screened section between approximately 400 and 500 feet bls. An alternate interpretation considered is that the contamination is entering the well from the upper Tuscaloosa itself. However, this zone is free of contamination only 250 feet away, as shown by the analyses of water samples from monitor wells MSB-34 TA and TB."
		Public health and safety will be protected by the extensive monitoring program and plume management and remedial action strategy that is planned for M-Area. When monitoring first confirmed the presence of chlorinated hydrocarbons in water from A-Area Tuscaloosa wells, the contaminated wells were shut down to protect onsite personnel. The monitoring in A- and M-Areas and neighboring municipal water wells has shown that the contaminants have not migrated offsite and that no offsite health risk will exist in the foreseeable future. The M-Area ground-water remedial action project, scheduled for implementation in August 1984, is being designed to prevent chlorinated hydrocarbons from reaching the Tuscaloosa Aquifer and any offsite well producing from the Tertiary ground-water system (Steele, 1983). The remedial program will arrest further migration of the present contaminant plume in the Tertiary ground-water system.
		State and Federal agencies are reviewing plans for impeding the growth of the contaminant plume and the removal of the chlorinated hydrocarbons using a combination of recovery wells, and a large air-stripper with a capacity of at least 9 times the incremental discharges to the M-Area seepage basin. Pilot and prototype air-strippers are currently operating in M-Area with capacities of 0.075 and 0.18 cubic meter per minute,respectively. In addition, the health of onsite personnel will be protected by changes in the water distribution system, which will obtain potable water only from the A-Area Tuscaloosa wells, which are unlikely to receive contamination from Tertiary aquifers.
		DOE has recently conducted a workshop to discuss and review the M-Area remedial action program. Participants included the EPA, SCDHEC, SC Water Resources Commission, USGS, DuPont, and Geraghty & Miller. All agreed that the planned program is sound technically.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		The L-Reactor incremental releases to the M-Area seepage basin are currently projected to be 0.16 cubic meter per minute; they are expected to be substantially smaller by the end of 1984. The incremental releases will not contaminate the groundwater within the Tuscaloosa Formation, nor will drawdown of the Tuscaloosa Formation by pumping in A-Area increase the movement from the seepage basin and Lost Lake areas to the watertable. The A- and M-Area ground-water remedial action project is scheduled to be operating by August 1984. The recovery wells will intercept seepage from the M-Area seepage basin and Lost Lake areas when it reaches the water table in about 10 to 17 years. Use of the M-Area seepage basin is scheduled to be discontinued by April 1985, when a wastewater treatment facility will be in service. Additional details are provided in Section 5.1.1.2, which has been expanded.
DA-5	Decommissioning of the Chemical Processing Facility basins is planned for late 1988. The effluent will then be routed to a wastewater treatment unit, with subsequent discharge to surface water. The present effluent, which is discharged to seepage basins, meets the definition of a hazardous waste based on pH and chromium. Groundwater in the area has been contaminated by both of these constituents, as well as radionuclides. As a result of seepage, surface streams and adjacent wetlands are receiving contaminated discharge from the groundwater system. Any additional discharge volume (i.e., the 33% additional volume from L-Reactor operation) can only contribute to the existing problem. Again, the health and safety implications of this issue need to be addressed in the Final EIS.	The amount of mercury and chromium released to the Separations Areas seepage basins has decreased since the early and mid-1970's. Before 1972, approximately 7.9 and 9.4 kilograms of mercury were released per reactor to the F- and H-Area basins, respectively. More recently, the average contribution per reactor has been about 0.7 and 2.1 kilograms, respectively. Releases of mercury to these basins is currently 0.5 and 8.0 kilograms per reactor. The addition of a second evaporator to process radioactive waste in the H-Area waste tanks has caused a small increase in the amount of mercury added to the H-Area seepage basin since mid-1982. In 1975 approximately 120 and 2310 kilograms of chromium were discharged to the F- and H-Area seepage basins respectively. The discharge of chromium to the H-Area seepage basin since 1982 was principally due to the processing of radioactive waste produced prior to 1982. After processing by the waste evaporator, the concentrated fractions are sent to the high-level radioactive waste storage tanks. Newly generated chromium that comes from the RBOF facility, which processes offsite fuels and removes oxide from onsite target assemblies, is processed through a waste evaporator. This process step greatly reduces the amount of chromium released to the H-Area seepage basins. Incremental releases of chromium to the H-Area seepage basin from SRP reactor support operations are currently about 0.2 kilogram per year per reactor and are not expected to be hazardous.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		On an annual average basis the releases of mercury and chromium to the F- and H-Area seepage basins are expected to remain at levels below those considered hazardous. Weekly composite analyses showed that the influent streams to these seepage basins were not hazardous with respect to mercury and chromium in 1982 (J.D. Spencer letter to G.A. Smithwick of 13 May 1983); these waste streams could be frequently classified as hazardous on the basis of low pH. In 1983, however, the waste streams to the H-Area basins exceed the hazardous limits of mercury and chromium about 10 percent of the time. Most of the chromium entering the basin is related to the processing of non-SRP fuel elements. In 1983 mercury exceeded the 200 microgram per liter hazardous limit in 6 weekly composite samples, reaching a maximum of 640 micrograms per liter. The source of mercury to the basins is waste tank evaporator overheads. Although more mercury will go to tanks as a result of L-Reactor restart, discharges of mercury should not increase significantly. Also, fewer exceedances of the mercury limit are expected because the amount of mercury being released has been reduced. The continued use of the F- and H-Area seepage basins is being evaluated on a sitewide basis (Section 6.1.6. and F.6 of the FEIS) Waste treatment facilities for the F- and H-Areas are being studied and bench scale demonstrations are being performed. The draft SRP Groundwater Protection Implementation Plan discusses the schedule for completion of the waste treatment facilities in the Separations Areas (October 1988) provided Congressional authorization and appropriation is obtained. The L-Reactor incremental releases to the Separations Areas seepage basins are projected to be 0.04 cubic meters per minute and 0.09 cubic meters per minute to the F-Area and H-Area seepage basins, respectively. The incremental releases are expected to increase the concentrations of constituents in the contaminant plume by about 7 percent. The water quality ofFour Mile Creek will be impacted as the ground water flows into the creek through seepline springs in lowlying wetland areas. Concentrations of constituents in the creek water will be increased by about 7 percent. However, drinking water standards are not expected to be exceeded, and the quality of the creek water is expected to be similar to that of the Savannah River below the outfall of C-Reactor. Radioactive constituents will meet DOE criteria for releases to uncontrolled areas when Four Mile Creek flows into the Savannah River. The direction of

Table M-2. DOE responses to comments on Draft EIS (continued)

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		ground-water flow and the ground-water islands make it highly unlikely that any contaminated shallow ground water will reach offsite ground-water users (Du Pont, 1983; DPST-83-829). Beneath the central portion of SRP, the predominant flow directions in the Congaree and Tuscaloosa are toward the Savannah River; these formations discharge to the Savannah River. Also see the responses to comments DA-2 and DA-4.
DA-6	The draft "Groundwater Protection Implementation Plan" proposes to decommission the Low Level Waste Burial Ground in the late 1990's; however, EPA has requested that the decommissioning and alternate disposal plan be expedited. The present practice of disposing of low level radioactive waste, in combination with chemical waste, into trenches in the ground does not represent state-of-the-art technology and may violate RCRA requirements. To increase the volume of waste which must be handled by this facility before the decommissioning plan has been developed, is out of logical phasing. Practically speaking, SRP needs to develop a proper disposal facility to handle the present volumes of waste materials before any additional waste is generated.	SRP operating procedures do not allow hazardous wastes to be disposed of at the SRP burial ground. An implementation plan is being developed at SRP to assure compliance with DOE requirements (DOE Order 5480.2) for the management of hazardous and radioactive mixed waste. A groundwater protection plan and a RCRA program management plan have been formulated by DOE for SRP. Research programs at SRP are investigating new methods for immobilizing and improving methods of low-level radioactive waste disposal at SRP. These programs include (1) wastewater treatment processes; (2) beta-gamma waste incineration; (3) immobilization and stabilization of waste in cement grouts (saltcrete and ashcrete); and (4) greater confinement disposal technologies.
	Impacts on the groundwater system from the discharge of contaminated water from the disassembly basin to a seepage basin located near the L-Reactor, have been discussed in the Draft EIS. Wastewater discharged to this basin is primarily contaminated with radionuclides which contaminate the upper aquifer and eventually discharge to Steel Creek. Alternatives to seepage basin disposal were discussed and evaluated in the EIS, with the subsequent conclusion that seepage basin disposal is the preferred alternative. As stated before, seepage basins do not represent state-of-the-art disposal technology and may violate RCRA requirements. Every attempt should be made to develop an appropriate alternative to replace the seepage basin, or to improve	Effluents discharged to F-, H-, and M-Area seepage basins frequently meet the definition of hazardous waste because of low pH. Typically, these waste streams can contain 1,1,1-trichloroethane (M-Area), chromium (H-Area), and mercury (F- and H-Areas). In 1982 the concentrations of these substances were below levels considered to be hazardous (J. D. Spencer letter to G. A. Smithwick dated May 13, 1983). However, in 1983 the waste streams to the H-Area seepage basin exceeded the hazardous limits for mercury and chromium about 10 percent of the time. As noted in response to comment DA-4, almost all of the chromium entering the H-Area seepage basin is related to the processing of non-SRP reactor fuel elements. In 1983, mercury exceeded the 200 microgram per liter hazardous limit in 6 weekly composite samples, reaching a maximum of 640

Table M-2. DOE responses to comments on Draft EIS (continued)

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	water quality before discharge to the groundwater, to minimize impact on the groundwater system and associated discharge areas. In the meanwhile, the range of potential consequences of this situation should be discussed in Final EIS.	micrograms per liter. The total discharge (including the L-Reactor incremental releases) of chromium and mercury are expected to be below their respective hazardous limits on an annual average basis. The contaminant plumes from the F-, and H-Area basins will be confined to the Tertiary groundwater systems. DOE Order 5480.2, "Hazardous and Radioactive Mixed Waste Management," was issued on December 13, 1982, to regulate the generation, transportation, treatment, and/or disposal of hazardous wastes at DOE defense-related facilities. As noted in Chapter 7 of this Final EIS, DOE is implementing--under the 22 February 1984 Memorandum of Understanding with EPA--a Hazardous Waste and Radioactive Mixed Waste Management Program which is comparable to the design and performance criteria, other technical requirements, and record keeping and reporting requirements of the regulations adopted by EPA to implement RCRA. The SRP hazardous-waste management program will meet the technical requirements of the EPA hazardous-waste regulations (40 CFR 260-266 and 270) and is compatible with SCDHEC requirements. DOE is also working closely with SCDHEC on all activities related to hazardous-waste management. The remedial actions proposed in the draft "SRP Ground-Water Protection Implementation Plan" are consistent with the DOE RCRA compliance program; initiatives will be compatible with SCDHEC hazardous-waste management regulations. DOE is formulating closure plans for seepage basins and the burial ground on a sitewide basis. The NEPA review of the ground-water protection plan will, when applicable, address the decommissioning of certain facilities to the extent practicable. The consequences that might result from the use of the L-Reactor seepage basin or one of the alternatives to its use have been discussed in Sections 4.1.2.2 and 4.4.3. Sufficient details are provided to assist the decisionmaker in formulating a reasoned decision relating to the disposal of deionized and filtered disassembly purge water.

Table M-2. DOE responses to comments on Draft EIS (continued)

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DA-7	o Control and disposal of hazardous wastes generated by the operation of the L-Reactor are not adequately addressed. The types and quantities of hazardous wastes produced and how those wastes are handled in terms of storage, treatment and ultimate disposal need to be detailed. The Final EIS should address the type of technical standards which DOE will use for the storage, treatment, and disposal of hazardous wastes, as well as how DOE will comply with state and federal environmental permitting requirements for hazardous waste facilities under RCRA. In a letter to EPA in November 1980, DOE stated that it considered its hazardous waste activities at the Savannah River Plant to be exempt from regulation under RCRA. However, a June 22, 1983, opinion from A. James Barnes, EPA General Counsel, states that RCRA applies to DOE facilities except in instances where application of those regulations would be inconsistent with the requirements of the Atomic Energy Act. From the limited information on page 5-2, it appears that the facility does generate some wastes which will be regulated under RCRA. Therefore, the Final EIS should provide a list of those waste chemicals which are considered hazardous under RCRA, and a description of how these wastes will be handled in compliance with RCRA. During the permitting process, EPA will evaluate all groundwater quality data, the design and operating procedures for those basins/ponds, and any other hazardous waste activities. Section 5.1.1.2 describes the increase in contamination of the groundwater as a result of the L-reactor operation but does not discuss any remedial action for cleaning up the groundwater. This contamination is coming mainly from seepage basins in the F and H areas, Since the "SRP Groundwater Implementation Protection Plan" is mentioned in the response to DA-2, and since the corrective action for the seepage basins in areas F and H would be accomplished under that plan, a tentative schedule for its implementation should be developed. This schedule would take into consideration the the uncertainties of the review process. If Order DOE 5480.2 incorporates the provisions of RCRA by reference, as stated, then it contains requirements for corrective action for groundwater contaimination.	Sections 4.1.1.5, 4.1.1.7, 4.1.2.1, 4.1.2.2, 5.1.1.2, 5.1.2.1, 5.1.2.2, and 5.1.2.8, which have been expanded, discuss discharges from L-Reactor and the incremental discharges in the F- and H-Areas and M-Area. The handling of these wastes will be in accordance with DOE Order 5480.2 and the 22 February 1984 Memorandum of Understanding with EPA. DOE will cooperate with and coordinate these activities with SCDHEC. Effluent treatment facilities that would take the place of the F- and H-Area seepage basins are scheduled to be completed by October 1988, and the seepage basins are scheduled to be decommissioned by the end of 1990, pending Congressional authorization and appropriation. Current plans call for discontinuing the use of the M-Area seepage basin before April 1985 and operating a process wastewater-treatment facility at that time. The M-Area ground-water remedial action project is scheduled for implementation in August 1984. Also see the response to comment DA-6.

Table M-2. DOE responses to comments on Draft EIS (continued)

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DA-8	o The effect on groundwater of material leaving the seepage basins poses some further environmental concerns involving RCRA. F&H area studies have shown that chemicals, e.g., mercury, 1,1,1,-trichloroethane and chromium from the seepage basins have entered the shallow groundwater system and are migrating through the saturated soil to outcrop zones and springs near Four Mile Creek. Although water quality in the Savannah River is expected to meet the criteria for a Class B waterway below Four Mile Creek, there is no mention of how these groundwater discharges affect Four Mile Creek. This appears to demonstrate a method of discharging pollutants to a stream without a permit by using the groundwater as the medium of transport. Furthermore, RCRA requires that all hazardous wastes be contained or, if a treated by the land treatment method, that the contaminant not go beyond the treatment zone. Since there is a definite relationship between reactor operations and waste products generated and stored in all areas of SRP, this matter needs to be resolved in the Final EIS. o Likewise, contaminants discharged to the seepage basin in M area have entered the groundwater. Methods to remove these contaminants are presently being investigated. Nonetheless, the basin will be deactivated in 1985. The resultant mitigation plan developed from these studies should be expeditiously formulated and made available for interagency review in a supplemental document. We recommend that closure plans for M area be developed immediately and that these closure plans contain enforced schedules. Post closure plans describing groundwater monitoring and corrective action for groundwater contamination, should also be developed. The closure and post closure plans should be submitted to EPA and the South Carolina Department of Health and Environmental Control for review. o In a related matter, there is concern that the resumption of L-Reactor operation will result in increased groundwater withdrawal. This could cause additional drawdown of the groundwater level beneath adjacent seepage basins, thereby increasing the tendency of contaminants to enter the groundwater and migrate. This possibility should be factored into any mitigation study with the range of potential impacts discussed in the Final EIS.	RCRA considerations are discussed in the responses to comments DA-6 and DA-7. Gas chromatograph scans for hydrocarbons in the effluent released to F- and H-Area seepage basins show concentrations of less than 66 micrograms per liter. These concentrations are similar to those measured in upgradient and downgradient ground water (Section F.5.3; Du Pont 1983, DPST-83-829). As noted in Sections 5.1.1 and 5.1.2 discharges of chemicals and radioactivity have migrated from the ground water beneath the F- and H-Area seepage basins to outcrop zones near Four Mile Creek. As a result, concentrations of chloride, nitrate, sulfate, sodium, and calcium are substantially higher in Four Mile Creek upstream of C-Reactor cooling-water effluent than in Upper Three Runs Creek; the concentrations of these chemicals in Four Mile Creek are similar to those in the Savannah River (Table 4.17 in DOE, 1982, DOE/EIS-0082). Tritium and nonvolatile beta activities are also elevated in this stretch of Four Mile Creek, (Ashley et al., 1982, DPSPU 80-302), but do not exceed DOE concentration guides for uncontrolled areas. Incremental impacts to the water quality due to L-Reactor operation are expected to be small. At most, the concentrations will increase by 7 percent. The water quality of Four Mile Creek above the C-Reactor outfall will remain similar to that of the Savannah River. Tritium and other radionuclides in Four Mile Creek will not exceed DOE concentration guidelines for releases to uncontrolled areas. The DOE commitment to ground-water quality protection and remedial actions in relation to M-Area are discussed in response to comment DA-2. The migration of contaminants from seepage basins into the shallow groundwater systems and the protection of public health and safety are discussed in the revised Sections 4.1 and 5.1 of this EIS as well as in response to comments DA-4 and DA-5. Several hydrogeologic systems exist beneath the SRP seepage basins. A thick clay unit of the basal Congaree and upper Ellenton formations overlies the Tuscaloosa sands and separates this unit from overlying units. Other clays hold intermediate positions between the Tuscaloosa and the surface. Thus,

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		drawdowns in the Tuscaloosa will not tend to increase the movement of pollutants from seepage basins to the groundwater. In A-Area the cone of depression in the Tuscaloosa Formation is not reflected in the water level of the overlying Tertiary groundwater system even though the green clay is discontinuous in this area. The green clay in the Separations Area is about 2 meters thick and has a very low permeability; it supports a head difference of as much as 24 meters. Measurements at the H-Area seepage basins indicate that the underlying Congaree Formation has not been contaminated by tritium migrating from these basins. The green clay also supports a large head difference at the Par Pond pumphouse well. Tritium concentrations in this well are below background levels even though Par Pond water exhibits tritium concentrations of 27,000 pCi/l. At the pumphouse and in L-Area the green clay is about 7 meters thick and very impermeable. Groundwater withdrawal from the Tuscaloosa Aquifer for L-Reactor and incremental use is expected to be only a few percent greater than in 1982. The green clay and other clay units above the Tuscaloosa Formation will continue to offer protection to Tuscaloosa groundwater in areas where the upward head differential between the Tuscaloosa and Congaree Formations becomes zero or downward.
DA-9	o The large, uncontrolled, thermal discharges pose major regulatory problems. Since 1980, when President Carter decided to increase production of nuclear materials, there has been an apparent presumption that the L-Reactor could be restarted without any control of the thermal discharge. This presumption was apparently based on the prior operation of the plant and did not account for pollution laws enacted subsequent to the reactor being placed on "stand-by" in 1968. The Draft EIS recommends discharge of untreated cooling water to Steel Creek. Steel Creek is presently classified as a Class 'B' stream in South Carolina. Such a classification means that the stream is suitable for fishing, survival and propagation of fish and other fauna and flora. The proposed action would allow eleven cubic meters/sec of effluent, at 80°C, to be discharged to the stream. Such action will effectively eliminate the present life forms from the stream. As such, we determine that the proposed action is not compatible with the established water use classification assigned to Steel Creek. We noted that Steel Creek was	Section 4.4.2 of the EIS, which discusses cooling-water mitigation alternatives, has been revised based on public comments received on the draft EIS. Specifically, Section 4.4.2 has been revised to provide a detailed discussion of additional combinations of various cooling-water systems. In Section 4.4.2, each of the cooling-water mitigation systems is evaluated for attaining the thermal discharge limits of the State of South Carolina. Section 4.4.2 and a revised Appendix I, Floodplain/Wetland Assessment, discuss the wetland impacts of each of the systems considered. The Department of Energy has been reviewing and evaluating alternative cooling-water systems for L-Reactor. Based on these reviews and evaluations, and consultations with representatives of the State of South Carolina regarding a mutually agreed upon compliance approach, a preferred cooling-water mitigation alternative is identified in this EIS. This preferred cooling-water alternative is to construct a 1000-acre lake before L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced biological community in the lake. The Record of

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	previously subjected to a thermal effluent and suffered adverse impacts similar to these noted above. However, since the discharge was terminated habitat/species succession has occurred such that the area has recovered, to a great extent. The proposed discharge would reverse the recovery and, in our evaluation, would be a violation of the State water quality standards. In a related matter, we believe the discussion of the NPDES permit action avoids a major issue. Namely, what alternatives will the Department of Energy consider if the permit is not granted under the conditions anticipated in the Draft EIS? o EPA has been performing various modeling analyses to estimate the radiological impact of current and future releases at the SRP. The results of these analyses compare closely with the calculated values which were generated by DOE and presented in the Draft EIS. In addition, field surveys were conducted by EPA to determine radioactivity in air emissions from the plant site by direct measurement. Although the report of this data is still in preparation, EPA's monitoring data appear to be within a few percent of DOE's results. These surveys and analyses were conducted not only for comparative purposes to verify EPA's analysis against DOE's models, but to establish an additional data base for EPA's standard setting effort under Section 112 of the Clean Air Act (CAA). Considering the dose and risk numbers which EPA generated for DOE facilities as a part of proposing standards for CAA, we find that the proposed L-Reactor operations will comply with the standard which EPA is proposing. o The total occupational doses which DOE expected from the operation of L-Reactor were also reviewed. "The total expected occupational dose from operation of L-Reactor and its support facilities is 360 person-rem (i.e., 69 person-rem for L-Reactor and 291 person-rem from support facilities). The average work force in each reactor area is about 375 people; thus, the average annual individual dose to workers in the L-Area will be about 185 millirem per year." Comparing these numbers to EPA's proposed Radiation Protection Guides (Federal Register Vol. 46, No. 15, Friday, January 23, 1981), which proposed 5 rem whole body, we found that L-Reactor will be below EPA's proposed Radiation Protection Guides for occupational workers.	Decision prepared by the Department on this EIS will state the cooling-water mitigation measures that will be taken which will allow L-Reactor operation to be in compliance with the conditions of an NPDES permit to be issued by the State of South Carolina.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	An assessment of the health impact from resumed operation of the L-Reactor indicates an estimated individual lifetime fatal cancer risk of 1.0E-4. The estimated collective cancer risk per year of operation is 5E-3, with 85 percent of the risk due to tritium. Ingestion is also the major contributing liquid pathway to health risk (72 percent). We can conclude from the above that the risks to the general public, off-site, should be considerably less than the estimated on-site risks. The EPA National Interim Primary Drinking Water Regulations, promulgated under the provisions of the Safe Drinking Water Act, became effective in June 1977, and apply to the community water supply systems such as those at Beaufort-Jasper, South Carolina, and Port Wentworth, Georgia, downstream of the Savannah River Plant. These regulations include limits for radionuclides, such as tritium, radiocesium, cobalt, and strontium, that will limit radiation doses to water users to less than 4 millirem per year. Both of these water supplies have been monitored by the states. Radiation exposures in recent years have been about 0.28 mrem/year. Based on the expected releases from the restart of the L-Reactor, its contribution has been estimated at up to .04 millirem per year from tritium, radiocesium and cobalt from the L-Reactor, or a contribution of about one-seventh of the total. The total dose of about 0.32 mrem/year is about one-twelfth (1/12) of the EPA Drinking Water Standard.	
DA-10	Further radiological and monitoring data should be presented at scheduled intervals, perhaps as supplements to the Final EIS, or as monitoring and data reports. This supplemental information should include any observed displacement of radioisotopes, which are now contained in Steel Creek sediments, together with and monitoring data from the seepage basins and surrounding wells, until such time that these seepage basins are discontinued.	Radiological monitoring of Savannah River water, water supplies at Beaufort-Jasper and Port Wentworth, and aquatic food supplies from the river and the estuary are reported annually in a series of reports entitled Environmental Monitoring in the Vicinity of the Savannah River Plant; the most recent issue, for calendar year 1982, is DPSPU-83-30-1. Expanded monitoring, to assess the displacement of radioactive isotopes in Steel Creek and in the Savannah River swamp, will be included in future issues of this report. Onsite monitoring of wells and seepage basins is reported annually in a series of reports entitled Environmental Monitoring at the Savannah River Plant. This report is an internal report for DOE and its contractors for use in reviewing the effects of ongoing SRP operations. DOE is considering placing this report in the DOE Public Reading Room in Aiken, South Carolina.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Specific Comments	
	2.2 *Proposed Action -- Restart of L-Reactor*	
DA-11	p. 2-11, Fig. 2-2 - The release data summary for SRP (Ashley, Zeigler, and Culp, DPSPU 81-25-1) refers to radionuclides seeping from the L Oil and Chemical Basin. Where is it and why is this source of radionuclides not mentioned in the DEIS?	The L-Area oil and chemical pit, which is approximately 70 meters northeast of the L-Reactor seepage basin, received low levels of radioactive oil and chemical waste from 1961 to 1979. This pit is no longer in use; it will not be used when L-Reactor operation is resumed. The pit will be included in the overall hazardous waste management program under DOE Order 5480.2.
	3.7 Radiation Environment	
DA-12	p. 3.57, para. 6 - Radiation exposure from dental prostheses and cardiac pacemakers are medical sources rather than environmental sources.	The statement on p. 3.57 of the draft EIS has been modified to delete dental prosthesis and cardiac pacemakers.
DA-13	p. 3-58, para. 4 - Internal dose may be site dependent. Individuals living near the SRP boundary may receive a higher internal dose from eating contaminated foods (H-3) than individuals living farther away from the plant. Also, the chemistry of different soil types will yield differing radionuclide uptakes by plant foods.	The internal dose referred to in this paragraph was the natural internal radiation dose (see Table 3-15 of the draft EIS). Such a dose, received primarily from natural radioactivity in the diet, is generally considered to be independent of a site because of the wide distribution of food and fertilizers.
	p. 3-61, para. 2 - The 1982 release of radioactivity from L-Area to Steel Creek produced concentrations below that which would be considered harmful. In fact, the concentrations reported to have been measured in the canal were less than the EPA limits for drinking water.	
DA-14	p. 3-63, Table 3-18 - The data in this table do not reflect the true contribution L-Reactor has had on the Cs-137 build-up in the sediments of Steel Creek. Referral to Table D-3 (p. D-8) shows that the area affected between L-Reactor and Road A is about 7 times greater than between P- and L-Reactor. Table 3-18 should be expanded to include this information or, at least, reference should be made to Table D-3 in a footnote.	Reference in the text of Section 3.7.2.1 has been made to Table D.3.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-15	p. 3-65, Figure 3-14 - How many of the 55 unexplained curies of Cs-137 can be explained by the uncertainty in the estimates? That is, what are the + values on the 284 Ci released and on the 229 Ci sediment inventory. Although only a minor contribution, the 0.4 Ci estimated to be in Steel Creek biota seems low. An estimate of the mass of vegetation along Steel Creek from L-Reactor to the Savannah River is apparently not included in the DEIS.	Inventory estimates were made using three different techniques based on stratified random sampling, aerial gamma spectroscopy, and a "weighted" analysis of radiocesium contents (microcuries per square meter) of individual soil cores. Error estimates could be calculated only for the stratified random sampling estimate: 56.89 ± 8.86 Ci (± 95 percent confidence limit). This estimate provided the lowest estimate (mean) of the radiocesium inventory. The highest inventory estimate was derived from the "weighted" soil core analysis (67.09 Ci). This highest estimate was used as the inventory in Steel Creek. Greater detail on these analyses is presented in Smith et al., 1982, Chapter VI). Section 3.7.2.1 and Appendix D provide possible explanatins for the unaccounted for cesium-137. The transport calculations were made independent of the inventory estimates. The transport during the first year attributable to biotic transport is based on a surficial biomass inventory of 304 grams per square meter. Based on Tables D-3 and D-10 of the Draft EIS and the biomass estimate of 304 grams per square meter, the transport estimate is about 0.13 curie, some 3 times less than the 0.4 curie used in the total transport estimate of 4.4 ± 2.2 curies during the first year.
	p. 3-66 - Concentrations of Cs-137, Co-60, and Sr-90 in water where there is a possibility for consumption are presently at levels that present no health hazards.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-16	p. 3-66, 3.7.2.3 - This section is vague and should be improved on the basis of measured Sr-90 concentrations in Steel Creek sediments and vegetation. DPSPU 81-25-1 records suggest that the 63 Ci are now in Steel Creek or downstream. The fact that kaolin has little sorptive capacity for strontium does not assure its absence in Steel Creek; nor does its absence in the Swamp downstream. Clay soils do not have quite the same ion-exchange characteristics for cobalt as they have for cesium. Thus, transport to the Savannah River may be more rapid for Co-60 than for Cs-137. However, Co-60 levels do not appear to be significant.	Approximately 0.5 curie of strontium-89 and 40.8 curies of strontium-90 were released to Steel Creek from L- and P-Areas (Ashley, et. al., 1982). Because of its short half-life (50.5 days), no measurable quantities of strontium-89 are likely to exist inthe creekbed sediments. Strontium-90 has a half-life of about 28 years. About 14.3 curies of strontium-90 have been lost by radioactive decay. Based on ERDA (1977) and Marter (1974), another 20.8 curies have been transported to the Savannah River. Thus, about 5.7 curies of strontium-90 might still remain in the sediments of Steel Creek. Soil coring in Steel Creek at Road B, Cypress Bridge, and near its mouth has detected strontium-90 concentrations ranging from 0.11 to 0.14 picocurie per gram in 1978 to 0.12 to 0.24 picocurie per gram in 1979. At the SRP control station, strontium-90 concentrations of soil samples were 0.06 picocurie per gram in 1978 and 0.14 picocurie per gram in 1979 (Ashley et al., 1982). These soil coring studies suggest that the inventory might be much less than 5.7 curies. It is not surprising that most of the strontium-90 has been transported from Steel Creek, because the kaolin clay particles of the creekbed sediments have little sorptive capacity for strontium. The distribution coefficient for strontium-90 in SRP kaolinitic soils might be as low as 20 (Oblath et al., 1983), at least 35 times less than that for cesium-137. Strontium-90 has not been detected above background levels in Creek Plantation swamp sediments. However, this radionuclide has been detected in composited swamp vegetation samples at concentrations of a few picocuries per gram (Marter, 1974).

Comment number	Comments	Responses
	4.1.2 Radiological Impacts of L-Reactor Operation	
DA-17	Page 4-24, Figure 4-6 - Some environmental transport models will include consumption of contaminated water by meat and milk producing animals. The authors may wish to recognize this potential pathway and comment on its relevance to the SRP in the text.	There is no known use of downstream Savannah River water to supply milk- or meat-producing animals or for farm crop irrigation. Assuming that irrigation of 1000 acres of farmland could potentially occur in the future, the dose to the consuming population would range between 0.005 percent of natural background radiation for leafy vegetation and 0.05 percent of natural background for vegetation. The dose for consumption of milk and meat would be between this range.
DA-18	p. 4-25, 4.1.2.2 - The earlier belief that lower-lying aquifers (Ellenton, Tuscaloosa) would not be contaminated by seepage has been undermined by observations of chlorocarbons in these aquifers at other locations on site. Can the statement in the third paragraph "tend to preclude contamination" be made more specific by groundwater quality data analysis at this location? "Mitigation" should probably be "migration" in the second paragraph.	The text of the EIS has been changed to reflect the information in this response and to correct the typographical error noted in the comment ("mitigation" to "migration").
DA-19	p. 4-27, Table 4-11 - Values listed in this table were computed and found to be correct. The radionuclides Mn-54, Fe-55, Fe-59, Co-57, and Ni-63, are not mentioned although they are common activation products. Were attempts made to measure them? p. 4-28 - NRC codes and parameters (Reg. Guide 1.109) were used to compute individual and population doses (Appendix B). Although these methods may not exactly duplicate those in use by EPA, they are comparable. Dose equivalents listed in Tables B-7 to B-10 for atmospheric releases from L-Reactor appear reasonable based on a 1982 EPA study of the airborne releases from P-Reactor.	Most of the radionuclides listed in Table 4-11 are those that will be released to the environment after filtration and deionization. These expected releases are based on radionuclide analyses of effluents from existing operating reactors. Manganese-54, iron-55, iron-59, cobalt-57, and nickel-63 are not normally detectable in treated reactor effluents at SRP.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-20	p. 4-29, Table 4-14 - If these dose equivalents are 100-yr dose commitments (p. B-35, para. 2) the table should so state.	All population doses shown in the EIS are 100-year dose commitments, as described in Appendix B. This has been clarified in the EIS.
DA-21	Page 4-28, 4-29 and Figure 4-6 - The pathways described in the text for liquid releases do not include use of river water for irrigation of human food crops or animal feed crops. However, Figure 4-6 shows irrigation as a pathway. In some dosimetric and risk calculations, irrigation has proven to be a major pathway to man. The authors should state their reasons for not including irrigation as a pathway in their individual and their population dose equivalent and risk calculations.	Figure 4-6 of the draft EIS is a generic exposure pathway description (not specific to SRP) that is covered in models recommended by the Nuclear Regulatory Commission (Regulatory Guide 1.109). There is no known use of downstream Savannah River water to supply milk- or meat-producing animals or for farm crop irrigation.
DA-22	Page B-14, last paragraph (continued on page B-31) - Since special models have been used for H-3, C-14, Kr-85, and I-129, the final EIS should provide the references for these models in the bibliography.	The Final EIS has incorporated the applicable references in the bibliography to Appendix B.
DA-23	p. 4-29, last para. - How does the drinking water concentration of tritium at the Beaufort-Jasper and Port Wentworth water intakes compare with the EPA drinking water limit? What does 0/yr water consumption mean in Table B-20? 1/yr?	Based on an average river flow rate of 294 cubic meters per second and tritium release values listed in Table 4-10, tritium concentrations in Beaufort-Jasper and Port Wentworth water will be 39 picocuries per liter and 1034 picocuries per liter from L-Reactor operation in the first and tenth years, respectively. These are 0.2 and 5.2 percent, respectively, of the EPA drinking-water standard of 20,000 picocuries per liter. The "0/yr" water consumption in Table B-20 was a typographical error; the entry should read "1/yr." This has been corrected in the Final EIS.
DA-24	Page B-32, Table B-18 - For some nuclides, limiting the environmental dose commitment (EDC) calculations to a 100-year integration period and to consideration of the U.S. population, may cause the major portion of the infinite EDC to the world population to be left unreported. For example, Fowler predicts the total body EDC to the world population for a release of 1 Ci of C-14 to the atmosphere (as CO_2) to be 28 man-rem/Ci	A 100-year environmental dose commitment (EDC) was used in the EIS rather than an infinite EDC; this provides more meaningful results by accounting for impacts over a period of time comparable to the maximum lifetime of an individual (Section B.5). Thus, it provides the measure of risk to an individual. Longer integrating periods or an infinite time integral would require extremely speculative predictions about man's environment for thousands of years into the future.

Comment number	Comments	Responses
	released with a 100-year integration period, 120 man rem/Ci released with a 1,000-year integration period, and a 537 man rem/Ci released with an infinite integration period (Fowler and Nelson, "Health Impact Assessment of C-14 Emissions From Normal Operations of Uranium Fuel Cycle Facilities," EPA 520/5-80-004, June 1979, Figure 5). Using Fowler's results to estimate the EDC to the world population during the 100-year period following release of 12 Ci of C-14 from the L-Reactor, one obtains 336 man rem (total body) compared to the SRP estimate of 8.4 (for the U.S. population). The infinite EDC due to the release of 12 Ci of C-14 to the atmosphere would be 6,440 man rem, using Fowler's data.	
DA-25	p. B-35 - The bioaccumulation factor used for Cs-137 in fish is 3000. According to the document this is a measured value, but it is much larger than values generally used that range between 40 and 1300 for freshwater fish. The use of 3000 probably overestimates the Cs-137 concentration in fish.	Section D.2.2 presents details on the selection of the cesium-137 bioaccumulation factor of 3000.
DA-26	p. 4-30, para. 4 - A discussion on pages D-31 and D-32 indicates that the estimated first-year sediment/water transport of Cs-137 after L-Reactor start-up was reduced from a 1981 estimate of 7.2 Ci to 2.3 Ci based on a recent estimate. The latter appears reasonable, but not having the references describing the first estimate (DuPont, 1982a) and considering the importance of this pathway, it would be useful to explain in Appendix D the reason for the 5.4 Ci/yr reduction.	Early estimates of radiocesium transport were based on modeling predictions (Du Pont, 1982, DPST-81-241). The transport estimates used in this EIS were based on measurements of radiocesium during cold flow tests. Using empirical data is believed to be the better method for determining annual activity that will be transported. The 1981 estimate of sediment-water transport was obtained by assuming (1) that the suspended solid concentrations in the secondary cooling water flowing in Steel Creek would be equal to that supplied from the Savannah River (15 milligrams per liter); and (2) that the suspended creek silts and clays would have a cesium-137 concentration of 1200 picocuries per gram of suspended sediment. Bed load transport was not considered. Thus, the 1981 estimate for sediment-water transport for the first and second years after restart was calculated to be 7.2 curies per year (0.015 gram per liter x 4.0×10^{11} liters per year x 1200 picocuries per gram x 1.0×10^{-12} curie per picocurie).

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		To refine these estimates, cesium-137 sediment-water transport was studied during the March 1982 testing of the secondary cooling-water system with discharges of Savannah River water at near-ambient temperatures and at flows as high as 6.2 cubic meters per second (more than half that expected during L-Reactor operation). These test results showed that the sediment-water transport would be 2.3 ± 1.8 curies (Section D.4.3.1) during the first and second years after the restart of L-Reactor. Subsequent monitoring results for 1983 support this estimate.
DA-27	p. 4-34, Table 4.17 - What radionuclide is responsible for the relatively high dose to the liver? Is it assumed to be Co-60?	The radionuclide responsible for the relatively high dose to the liver is cesium-137. Cobalt-60 contributes less than 1 percent to the liver dose to all age groups.
DA-28	From a comparison of liquid pathway doses, that due to the mobilization of Cs-137 and Co-60 from Steel Creek sediments exceeds the impact of all other pathways many times. This is clearly illustrated in Table 4-19. This is a very significant fact that should greatly influence the surveillance program initiated when L-Reactor begins operation.	See the response to comment DA-10.
DA-29	p. 4-35, para. 1 - It states in the text that the maximum population dose is 27.6 person-rem in the tenth year of operation, whereas Table 4-19 lists a value of 14.3 person-rem for that period. Is the 27.6 person-rem a committed dose, or why the apparent disagreement?	The 27.6 person-rem in the tenth year is the sum of the 80-kilometer population dose (14.3 person-rem) and the Port Wentworth and Beaufort-Jasper population dose (13.3 person-rem) listed in Table 4-19 of the draft EIS.
	p. 4-35, para. 2 - The health effects listed here are correctly computed using the values of 120.3 fatal cancers per million person-rem given in Table B-49 for low-LET radiation, and 257 genetic effects per million person-rem given in Section B.6.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	4.2.1 Reactor Accidents	
DA-30	p. 4-38 - The curie quantities of Ar-41 released by SRP reactors are second only to tritium estimated for L-Reactor: (19,500 Ci/yr vs. 54,900 Ci/yr from Table 4-10), yet no mention is made of the release of any Ar-41 following an accident. Granted, Ar-41 has a short halflife (1.83 hr) and much would decay during transit to the site boundary. However, considering the distance to the site boundary to be 9 km (5.6 miles), half the Ar-41 would survive to the site boundary assuming a wind speed of only 3 mph. Thus, Ar-41 should be included in an accident analysis of L-Reactor, or an explanation given as to why it has not been considered.	A small annulus surrounds the reactor tank; ventilation air flows through it during normal operations. Argon-41 is formed by neutron capture of argon-40 present in the air, which is vented through the airborne activity confinement system and the 61-meter stack. Because argon is a noble gas, it is not trapped by the confinement system. In the event of an accident, the reactor is promptly shut down; argon-41 production essentially stops. The dose contribution from argon-41 is negligible compared to that from noble gas fission products in any accident scenario.
DA-31	p. 4-41, para. 2 - Isn't immersion in the plume a usual airborne exposure pathway considered, or have you considered this as plume shine? They are not the same and immersion should be considered.	Changes have been made in the EIS to clarify this point.
DA-32	p. 4-53, last two para. - Following an accident all coolant, ESC flow, and any other contaminated water is retained in holding tanks. Thus, none will be released to Steel Creek and the Savannah River. However, what releases will occur later during clean-up and reactivation of the reactor?	All water used in reactor cleanup and reactivation would be processed to remove radioactivity before its discharge.
	5.1.2 Radiological Effects of Support Facilities	
DA-33	p. 5-12, Table 5-7 - It is surprising that no U-238 is released to surface streams.	All effluents with detectable amounts of uranium will be discharged to seepage basins (Table 5-8). Thus, Table 5-7 lists no releases directly to surface streams.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-34	p. 5-12, 5.1.2. - Accidents and incidents in support facilities are not discussed as sources of radiation exposure, although their potential should be considered. Every few years, significant amounts of tritium are accidentally released to the atmosphere and elevated plutonium levels on site are due to such an accident.	The major sources of tritium releases are associated with SRP facilities that are involved in the production of tritium. Since the purpose of L-Reactor is the production of plutonium, only those support facilities involved in the processing of plutonium are discussed in this EIS. A new section, Section 5.1.2.9, has been added to this final EIS to discuss the incremental risk of accidents for support facilities.
DA-35	p. 5-13 and p. B-48 - The maximum organ dose to the adult, like the child, is to the bone (0.12 mrem/yr) rather than the total body dose of 0.022 mrem/yr given in the report. This should be mentioned. Also, eating fish and drinking water are the critical water pathways. Also, what radionuclides contributed most to the bone dose?	The main body of the DEIS generally presents only doses to the age group receiving the highest body or organ doses. Doses for all age groups and all organs are presented in Appendix B. Fish and drinking-water pathways accounted for most of the bone dose; strontium-90 contributed the most to this dose.
DA-36	Table B.30 to B.33 - A comparison of the dose received during the first year due to support facilities leads to an interesting observation that cannot be explained by the information provided. Except for the dose to bone, which is identical during the first and tenth years for the 80 km population, the maximum individual, and for the population drinking water (Beaufort-Jasper and Port Wentworth), a large increase (5-7 times) occurs to the organ doses of the population drinking water from the first to the tenth year that does not occur to the maximum individual or to the 80 km population. It does not appear that the release to surface streams from the seepage basins could account for this large increase. Only the thyroid dose increases similarly among the three groups (a factor of about 6) which is assumed to be due to I-131, but it should have totally decayed during the three to four year delay in reaching the surface streams from the seepage basins (p. 5-15).	Doses during the first year are based on direct releases to surface streams (draft EIS Table 5-7). During the tenth year, additional radioactivity will enter surface streams from seepage basins (draft EIS Table 5-9). Most of the dose increase to downstream individuals and populations between the first and tenth years is caused by the increase in tritium releases. This increase has little effect on the 80-kilometer-radius population because they do not consume river water. The exposure pathways for the 80-kilometer-radius population are fish, shoreline activities, swimming, and boating (Appendix B).

Comment number	Comments	Responses
	If there is a simple explanation for these increases in organ doses from support facility effluents, it should be given. See table below.	

Tenth year dose/first year dose

Bone	Liver	T. Body	Thyroid	Kidney	Lung	G.I.
80 km population						
1.0	1.0	1.1	5.1	1.1	1.4	4.1
Maximum individual						
1.0	2.0	2.2	6.7	3.1	4.7	6.2
Beaufort-Jasper and Port Wentworth						
1.0	6.5	5.5	6.8	5.9	6.7	7.2

Comment number	Comments	Responses
DA-37	p.5-14, Table 5-8 - See above comment for Table 4-11; also consider I-129 in liquid effluent.	Only trace quantities of iodine-129 are released in liquid effluents. Such releases are included in the category "other beta, gamma" in Table 5-8. For purposes of dose calculation, "other beta, gamma" was conservatively assumed to be strontium-90 (Table 5-8, footnote C).

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-38	p. 5-15 - We believe that the critical pathways and radionuclides are important information. Although the pathways can be obtained from Appendix B, it would be useful to include it here. For example, the thyroid is the critical organ and the dose received is primarily due to consuming vegetables and milk containing radioiodine. Possibly the two short paragraphs presenting the doses from atmospheric releases can be expanded to include this information.	To avoid overburdening the reader with voluminous tables of pathway analysis in the main body of the EIS, this data is presented in Appendix B. Material has been added to Section 5.1.2.3 of the EIS to identify the pathways (milk and vegetation) and radionuclides (iodine-129 and -131) that contribute most to the maximum organ (thyroid) dose.
DA-39	p. 5-16, Table 5-10 - The tritium value seems to be for the first year, with ten times as much released after 10 years, but this is not mentioned. For the separations areas (F&H) the listed value for tritium (H-3) is 8.6 x10^3 Ci/yr while DPST-82-1054 Savannah River Plant Airborne Emission and Controls report indicates a value of 8.6 x 10^4 Ci/yr for the separations areas.	Tritium atmospheric releases of 9.4 x 10^3 curies total do not increase for support facilities as they do for L-Reactor between the first and tenth years. Release estimates for tritium are correct for the type of operation planned for L-Reactor.
DA-40	p. 5-17, Table 5-11 - The lower total body dose from atmospheric releases after 10 years does not make sense in view of the much higher tritium releases. Neither does the explanation that maximum exposure locations are changed. To the best of our knowledge, the atmospheric dispersion model applied by SRP is simplified so that all sources are assumed to be released at a central location on site.	Atmospheric dose calculations for L-Reactor use L-Reactor as the release point; doses from support facilities are calculated as if releases occurred at the center of the Plant. The location on the site boundary where the maximum individual resides was selected as the place where the total maximum offsite doses from L-Reactor and support operations are predicted to occur. Because releases are constant over time from support facilities but increase over time for L-Reactor tritium, the geographic location of L-Reactor with respect to total releases becomes more important over time. Thus, the location of the individual receiving the maximum dose from L-Reactor plus support facilities changes with time. This is not caused by a change in atmospheric dispersion with time.
DA-41	p. 5-17, Table 5-11 - It is highly unlikely that the individual receiving the maximum airborne exposure will also be the same person receiving the maximum exposure through the aquatic pathway. It is probably not appropriate to add these two doses, but it does show a very small total dose.	As stated in Section 5.1.2.4 of the EIS: "The numbers listed as totals for individual and population doses are conservative maximums; to receive these doses, the composite individual (or population) would have to occupy several locations simultaneously."

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-42	p. 5-17, para. 1 - The maximum population dose of 8.1 person-rem for the tenth year is correct only if the Port Wentworth and Beaufort-Jasper population receives the 2.8 person-rem via the air pathway. It is assumed they would not be outside the 80 km radius. p. 5-17, last para. - The health effects checked by calculation were found to be correct using the factors given in Appendix B.6.	See the response to comment DA-41.
DA-43	p. 5-18, Table 5-12 - Is additional utilization of Savannah River water for public water systems downstream contemplated in view of current groundwater level lowering in the Savannah-Hilton Head area? Such increased consumption would increase the regional population dose. p. 5-18, Table 5-12 - Values listed in this table were correctly summarized from earlier tables.	Utilization of Savannah River water is based on projections for the year 2000; it includes growth in consumer population size caused not only by population growth but also by changes from well-water supply to river-water supply by a sizeable portion ofthe population for both Beaufort-Jasper and Port Wentworth.
DA-44	p. 5-19, para. 1 - Adding these doses is a very conservative approach, but is not appropriate (see similar comment above). It may conceivably be the same individual that receives the maximum dose from the liquid releases and radiocesium transport, but it is highly improbable that this person will also receive the maximum atmospheric dose. p. 5-19, para. 5 - The health effects were correctly computed for the U.S. population beyond the 80 km radius of SRP using the factors given in Appendix B.6. 5.2.6 Cumulative Impacts-Radiological Effects p. 5-33, Table 5-19 - Values in this table agree with those in Appendix B.	See the response to comment DA-41.
DA-45	p. 5-33, Table 5-19 - Values under the liquid release column (Regional Population Dose) have included in them the contribution from consuming water in the Beaufort-Jasper and Port Wentworth regions and, thus, should so indicate with superscript (c) on each value.	Through typographical error a Greek phi was printed after "Regional Population Dose" in Table 5-9. This has been replaced with a "c" in the Final EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-46	p. 5-33, Table 5-19 - Do these doses include the effect of I-129 releases based on actual measurements in vegetation and thyroids? The paper by Kantelo, Tiffany and Anderson in Environmental Migration of Long-Lived Radionuclides (IAEA, Vienna, 1982) p. 495 indicates a maximum (worst case) dose of 1.6 mrem/yr. The summaries are difficult to check because Appendix B dose compilations are not itemized by radionuclide; could this information be provided?	Doses listed in Table 5-19 are based on models described in Appendix B and include no doses based on actual environmental monitoring data. However, data from studies at the Savannah River Laboratory by Kantelo have been used to verify model calculations of iodine-129 dispersion in the environment.
DA-47	p. 5-34, Table 5-20 - According to footnote (a), concentrations of Co-60 in drinking water were based on a dilution with 300 cubic meters of water per second. However, there is no reduction in the Co-60 concentration between river water below the plant and drinking water at Port Wentworth or Beaufort-Jasper. Also, why is the Sr-90 concentration not considered for dilution along with some decontamination of the water treatment plants?	Cesium-137 concentrations in Beaufort-Jasper and Port Wentworth drinking water are based on studies made in the mid-1960s when cesium concentrations were more easily measurable in river and water-treatment-plant water. These concentrations take into account additional dilution downriver from other surface water and decontamination across the water-treatment plants. Decontamination data were not available for cobalt-60 or strontium-90; thus, no adjustments were made for these radionuclides in Table 5-20.
DA-48	p. 5-34, Table 5-20 - The I-131 concentration in milk due to L-support is inconsistently high relative to the entire SRP source; which is wrong? Similarly, the C-14 concentration in air due to L-Reactor is inconsistently high relative to the entire SRP source.	Typographical errors account for the apparent discrepancies in Table 5-20. Iodine-131 concentration in milk from L-Reactor support facilities should be 1.2×10^{-3} picocuries per liter rather than 1.2×10^{-1}. Similarly, carbon-14 in the air from L-Reactor should be 9.3×10^{-3} picocuries per cubic meter rather than 9.3×10^{-1} picocuries per cubic meter. The concentration of argon-41 from SRP should be 1.4×10^{1} picocuries per cubic meter rather than 1.4×10, making the total 2.3×10^{1} instead of 2.3×10. These have been corrected in Table 5-20 of the Final EIS. In addition, the footnote to this table has been changed to clarify how concentrations were calculated.
	p. 5-35, para. 1 - The computation of health effects are correct based on factors given in Appendix B.6.	
	6.1.1 SRP Monitoring Programs	
DA-49	p. 6-1, para. 3 - A brief description of the TRAC Laboratory Plume Monitor and its capabilities should be included in this discussion. It is certainly an asset to SRP airborne surveillance capabilities.	The TRAC plume monitor is a research vehicle and is not used in the routine environmental monitoring program. However, it is available and will be used in the event of a plant radioactivity release accident.

Comment number	Comments	Responses
DA-50	p. 6-10, Section 6.2.4 - The monitoring for Cs-137 in the creeks accepting discharges, and especially in Steel Creek, and in the Savannah River adjacent to SRP, has special importance because this Report strongly indicates that this is the pathway (redistribution and transport of Cs-137 in creek sediments) that will have the greatest radiological impact due to L-Reactor start-up. Therefore, it is crucial that an intensive study be taken during the first year following start-up to monitor and measure the quantity of Cs-137 that is transported along the creeks and into the Savannah River. Also, the study should be continued after the first year to confirm if a decrease in Cs-137 transport occurs as is predicted. The document states that Cs-137 is below detectable levels in the Savannah River and that a special monitoring program for Cs-137 will be initiated. Does this special program include making absolute measurements of the Cs-137 in river water? It is believed that periodic measurements of the actual Cs-137 concentration in the river water should be determined before and after L-Reactor start-up. This can be accomplished by concentrating the Cs-137 from large water volumes by ion exchange with further concentration, if necessary, by published radiochemical techniques.	See the response to comment DA-10. When necessary, cesium-137 concentrations in river water will be monitored by techniques appropriate to the concentration levels. This includes the use of ion-exchange columns to remove and concentrate cesium-137 from water for radioanalysis.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	STATEMENT OF MARGUERITE S. RICE 3021 Fox Spring Rd. Augusta, GA 30909 November Melvin J. Sires III U.S. Dept. of Energy Savannah River Operations Office P.O. Box A Aiken, So. Carolina 29801 Dear Melvin Sires: I am an individual, a family member, a registered nurse in the Augusta area, concerned with maintaining health, preventing illness, and helping people regain their well-being. I am well aware, in this field, of how interdependent we are, not only with one another but with other animals, plants, air, water - in other words with everything that constitutes our environment. Major changes are not made in one area or with one segment of the population that do not have far-reaching effects on us all.	
DB-1	Such is the nature of my concern over the proposed restart of the L-Reactor at SRP. A tremendous increase in the amount of scalding water going into a CSRA creek is not only in violation of state water quality regulations but is a violation of the very life of plants and animals in that area which in the ecological balance affects not only their lives but ours as well.	See the responses to comments AA-1 and AA-3 regarding cooling-water mitigation alternatives and DOE's commitment to comply with applicable Federal and state environmental protection regulations, and the response to comment BM-1 regarding DOE's Record of Decision on this EIS.
DB-2	I am also totally opposed to using the Savannah River as a waste dump for radioactive and/or toxic chemicals.	See the response to comment BT-2 regarding water quality.
DB-3	The necessity of meeting production schedules is not a reasonable response to me or any others who have felt the health and safety of the area residents at severely increased risk over this proposed restart of the L-Reactor.	As pointed out in the EIS, the need for plutonium was established by two different administrations in Nuclear Weapons Stockpile Memoranda. Also see the responses to comments AA-3

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		and AB-17 regarding DOE's commitment to comply with all applicable Federal and state environmental protection regulations and the effects of past radiological releases.
	I sincerely hope that my views will not only be added to those of others but will be heard. Thank you. Sincerely, Marguerite S. Rice	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	STATEMENT OF MICHAEL MURRAY Michael Murray 13 Warbler Lane Hilton Head Island, SC 29928 November 5, 1983 U.S. Dept. Energy P.O. Box A SRP Operations Office Aiken, SC 29801 ATTN: M.J. Sires III Dear Mr. Sires:	
DC-1	The environmental impact statement addresses the epidemiological studies, but fails to study entomological studies: namely "Pacco Wave" Theory. Also Drs. Sergie Carpista of the USSR and Dr. Carl Sagan and Dr. Edward Teller agree in principle that a limited 5 megaton atomic warfare would eventually annihilate the world by blowing up the ozone, creating dust clouds and causing a freeze, starvation and billions of deaths. Why build more A bombs in light of these recent findings. Please do not reopen the L-Reactor until further studies are made. M. Murray	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.

Comment number	Comments	Responses
	STATEMENT OF LAWRENCE D. BENEDICT Lawrence D. Benedict 38 Ivy Chase Atlanta, Georgia 30342 November 7, 1983 Melvin J. Sires, III Assist. Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, SC 29801 Dear Mr. Sires: I have previously addressed statements during Savannah River Plant EIS hearings representing the League of Women Voters, Savannah-Chatham and, at times, The Georgia Conservancy and Coastal Citizens for a Clean Environment. I presume our views still coincide. But we have moved from Savannah to Atlanta since last I testified at a scoping hearing in Savannah and present this written statement as a concerned citizen. Please see address change above.	
DD-1	I note with great satisfaction the declaration by the Environmental Protection Agency that the planned restart of the Savannah River Plant's idle L-Reactor is "environmentally unsatisfactory." Interestingly, that was a conclusion reached more than a year ago by EPA staffers, but muzzled by the then top administrators of the Agency. We also thought so, and said so, ever since the proposal to reactivate a 1953 piece of nuclear machinery surfaced in 1980!	EPA's "environmentally unsatisfactory" rating is based primarily on a concern that no final agreement had been reached with the State of South Carolina on cooling-water discharges and a National Pollution Discharge Elimination System Permit. DOE is working with both the state and EPA to resolve these concerns. Also see the response to comment AA-1 regarding cooling-water mitigation alternatives.
DD-2	Furthermore, we do not believe the DEIS findings produced anything to assuage our anxieties about damages to be caused by super heated water discharges and escape of radioactive gasses.	L-Reactor direct cooling-water discharges to Steel Creek would be at about 73°C and, hence, would not be super-heated in the ordinary sense, although they would be above South Carolina

Comment number	Comments	Responses
	Bashear, according to UPI, did state, "the environmental impact statement is essentially OK, but a final EIS must be approved," we wonder if there is time left to produce an acceptable statement? Obviously EPA is as concerned as we are about ground water contamination, the discharge of heated effluent into Steel Creek and "uncertainties involving the disposal of various potential and actual hazardous wastes generated from reactor operations."	standards for discharge to Class B streams. Also see the response to comment AA-1 regarding cooling-water alternatives in this Final EIS. Airborne radionuclide releases from the Savannah River Plant are about a factor of 10 below the proposed new EPA standard and are thus not expected to be a major problem; a continuing effort is underway to reduce these releases. Also see the response to comment AJ-1 regarding groundwater contamination.
DD-3	We fail to see in the DEIS any signs of mitigation measures to correct the widely recognized L-Reactor deficiencies. There is passing mention of cooling towers and containment domes, but no indication they will be in place prior to reactivation. I personally will insist these measures be installed. I'm sure the League of Women voters will agree, as will other Georgia and South Carolina environmental groups. The very concept of rushing into reactivation without considering the warning of EPA and ignoring the wishes and concern of the majority citizenry of the SRP area, is foolish, perhaps disastrous. We hope this administration takes heed. Thank you. Sincerely, Lawrence D. Benedict	Mitigation measures are discussed in detail in Section 4.4 of the EIS. See the responses to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives, and the response to comment BF-7 regarding containment domes.

Comment number	Comments	Responses
	STATEMENT OF EUGENE J. CARROLL, JR. Center for Defense Information 303 Capitol Gallery West 600 Maryland Avenue, S.W. Washington, D.C. 20024 November 1, 1983 Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, SC 29801 Dear Mr. Sires:	
DE-1	The Center for Defense Information is unable to address in detail the important environmental issues surrounding restart of the Savannah River Plant's L-Reactor, but we can speak directly to the actual need for a fourth strategic materials production plant at Savannah River. Even setting aside for the moment very pertinent questions about the military utility of adding thousands of nuclear weapons to an already overburdened U.S. arsenal, CDI can identify no compelling need to restart the L-Reactor.	See the response to comment AB-8 regarding the need for material.
DE-2	Reductions in planned nuclear weapons production programs made over the last two years clearly obviate the 1980 decision to restart the L-Reactor. The planned number of Air-Launched Cruise Missiles has apparently been cut by more than 1,000. The number of MX warheads has been cut in half by 1,000. To date, Congress has foreclosed production of 1,000 155mm neutron artillery rounds. Production of 500 warheads for the Sentry anti-ballistic missile and another 500 for the Standard Missile-2 anti-aircraft weapon has been moved to the out-years. Although the Reagan Administration is still calling for an unconscionably large growth in the U.S. nuclear arsenal,	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	3,000 weapons have been cancelled outright and another 1,000 delayed since the initial decision to restart the L-Reactor.	
DE-3	At the same time, it is reported that higher levels of production at the P-, K-, and C-Reactors resulted in a 500-kilogram surplus of supergrade plutonium in FY 1982 and FY 1983. This plus planned introduction of more efficient Mark-15 production cores, put to rest the concerns raised in 1981 about a shortage of strategic materials to support the Reagan Administration nuclear buildup. Failure to obtain approval of the 155mm neutron artillery round and delay of the Sentry ABM, both heavy users of tritium, further reduce the requirement for new tritium production.	See the response to comment BL-20 regarding material needs as defined in the NWSM, and the response to comment BL-21 regarding production alternatives.
DE-4	It is difficult to square the Department of Energy's drive to restart the L-Reactor with the worry often aired by its officials that strategic materials production is too concentrated geographically. Current plans to restart the Purex Reprocessing Plant at the Hanford Reservation and build new production facilities at the Idaho National Engineering Facility certainly do more to meet these concerns than would restarting the L-Reactor.	Geographical distribution of defense nuclear material production facilities is one of a number of factors that is considered in the evaluation of future production capacity. However, restart of L-Reactor in combination with implementation of planned initiatives is necessary for meeting near-term defense nuclear material needs. There are no other viable options at other DOE sites that could provide the needed materials.
DE-5	Finally, if the Reagan Administration is truly committed to its assorted START and build-down proposals, the DOE will be able to reprocess more strategic materials from "built-down" warheads than it could ever need for a smaller number of new nuclear weapons. Sincerely. Eugene J. Carroll, Jr. Rear Admiral, USN (ret.) Deputy Director	See the response to comment BL-19 regarding utilization of material from retired weapons.

Comment number	Comments	Responses
	STATEMENT OF SUZANNE A. SHUMAN 128C E. 60 Savannah, GA 31405 Oct. 28, 1983 Representative Thomas:	
DF-1	As a concerned citizen, mother, and teacher, I am writing to you concerning the L-Reactor's E.I.S. I think the EIS conclusions are unacceptable. Please establish an oversight committee of the Savannah River Plant facility. I am also concerned about not having provisions for cooling towers or a containment dome.	See the response to comment BQ-2 regarding existing oversight mechanisms, the response to comment BF-7 regarding containment domes, and the responses to comments AA-1, AA-3, and AB-13 regarding cooling-water mitigation alternatives.
	Thank you for your concern, and efforts. Sincerely, Suzanne A. Shuman	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	STATEMENT OF AMY G. DARDEN	
	October 31, 1983	
	Dear Representative Thomas:	
	The Department of Energy's Draft Environmental Impact Statement, L-Reactor Operation, Savannah River Plant overlooks several significant points that I would like to bring to your attention.	
DG-1	In the thirty years of plant operations at SRP there has never been an independent study of the health and environmental effects of the reactors at SRP that was not conducted by, financed by, or based on data collected by the DuPont Company. *DOE's EIS is overwhelmingly based on DuPont publications.* The people who live in Georgia and South Carolina deserve to know what the health effects of SRP are; it appears that we will have to wait longer since no one in a position of authority seems concerned that an independent study has not been undertaken. According to the South Carolina Bureau of Vital Statistics infant mortality rates and cancer rates in counties adjacent to SRP are 4-10X higher than in other areas of the state. As every high school biology student learns, there is no safe dose of radiation. It takes only one radioactive particle, one cell, and one gene to start the cycle of cancer and genetic mutation.	See the responses to comments AV-8 and CG-1 regarding health effects and epidemiological studies.
DG-2	But at SRP's reactors there are no containment domes and no cooling towers. Is there any logic as to why reactors making weapons grade materials are not held to the same safety guidelines as commercial nuclear power plants? With its emissions of radioactive gases and cooling water the L-Reactor will have an impact on the health of human, plant, and animal populations in Georgia and South Carolina.	Estimates of atmospheric releases from L-Reactor and its support facilities are given in Sections 4.1.1.6, 4.1.2.1, and 5.1.2.2. These releases result in ambient air concentrations that fall within all applicable state and Federal guidelines. Also, see the response to comment BF-7 regarding containment domes, and the responses to comments AA-1, AA-3, and AB-13 regarding cooling-water mitigation alternatives.
DG-3	The DOE has also failed to find the solution to the problem of solid wastes disposal. Solid wastes are considered much safer than liquid radioactive wastes which are already leaking from containers into the Tuscaloosa aquifer. But are we prepared to	No liquid radioactive wastes have been found to have leaked into the Tuscaloosa Aquifer. As described in the EIS, some contamination of Tuscaloosa wells has occurred from nonradioactive degreasing agents; see the response to comment AJ-1.

Comment number	Comments	Responses
	protect the public from those wastes over the enormous periods of time that must pass before the wastes lose their radioactivity?	With respect to the disposal of high- and low-level radioactive waste see the responses to comments AV-2 and BA-5.
	The SRP has been described as the "bomb that has already been dropped." As a biologist concerned with life and particularly with human life, I am appalled at the flagrant oversights in the EIS and the massive duping of the public by the Department of Energy. The L-Reactor was commissioned to make plutonium and tritium for nuclear warheads to be used in our nation's defense. When is someone going to defend the citizens against the bomb makers?	
	I will appreciate your evaluation on the safety of life in our area if the L-Reactor startup proceeds in January 1984.	
	Yours for a safe and healthy world,	
	Amy G. Darden 7911-A Tybee Rd. Savannah, GA 31410	

Comment number	Comments	Responses
	STATEMENT OF DORETHEA SMITH Oct. 31, 1983 Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801 Attn: EIS for L-Reactor Dear Mr. Sires, I'm very concerned about the environment we live in today, we have the Department of Energy (DOE) along with the Environmental Impact Statement. The L-Reactor Operation at the Savannah River Plant should be study very careful because we are talking about human being, and the environment which we live in.	
DH-1	The startup of the L-Reactor will increase by 33% the load on seepage basins currently leaking toxic chemical into fresh-water source for much of the Southeast. The amount of liquid high-level wastes produced at the Savannah River Plant will increase by 33%.	See the response to comment AJ-1 regarding the use of seepage basins and the responses to comments AV-2 and BA-5 regarding the disposal of high- and low-level radioactive waste.
DH-2	The Department of Energy plans involve the flushing of radioactive cesium into the Savannah River. This is not safe and I feel the startup of the L-Reactor should be avoided in South Carolina.	See the response to comment AA-2 regarding the relationship of radiocesium and radiocobalt concentrations to EPA drinking water standards.
DH-3	The Department of Energy facilities should be required to comply with federal and State Environmental Standards applicable to commercial reactor sites; and very serious steps be taken to avoid damage to the environment before startup. And if proving not to be safe for our environment that we live in, I urge you and others not to start up the L-Reactor in South Carolina for the production of plutonium.	See the responses to comments AF-1, BF-7 and BF-8 regarding the differences between SRP reactors and commercial light-water reactors, and the responses to comments AA-1, AA-3, and AF-2 regarding DOE's commitment to comply with all applicable Federal and state environmental regulations and to take all reasonable steps to mitigate impacts.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	I would like to have a copy of the Final Draft Environmental Impact Statement along with any other information you can share with me. Thanking you in advance for your assistance, Sincerely, Dorethea Smith	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses

STATEMENT OF FRANCES HART

ENERGY
RESEARCH
FOUNDATION
2530 Devine Street
Suite 201
Columbia, South Carolina 29205

Frances Close Hart
Board Chairperson

John M. Lawson
Executive Director

Dear Mr. Sires,

I enclose a statement by Dr. George W. Rathjens of the Massachusetts Institute of Technology regarding the need for plutonium as it relates to the startup of the L-Reactor.

I submit this for the EIS record for Dr. Rathjens, along with a copy of his professional biography which I would like to put on the record with his statement.

The hearing seemed extremely well-organized, as usual, and thank you for allowing us to appear, and well as for your always prompt and pleasant help in our requests for information.

I look forward to seeing the final EIS.

Sincerely,

Frances Hart

Comment number	Comments	Responses
	STATEMENT BY DR. GEORGE WILLIAM RATHJENS November 1, 1983	
	I do not have the expertise, nor have I had the time, to review the parts of the Environmental Impact Statement that address the effect of reactivation of the L-Reactor on the environment. My impression is that a competent job has been done and that the statement fairly describes what might be expected. The unclassified version of the statement does not, however, provide enough information on alternative means of increasing plutonium and tritium production for me or, I believe, other readers, to judge whether its conclusions in this respect are sound. And most importantly, it is totally unconvincing in justifying the need for increased production of these materials. Indeed, it makes no attempt to do so, claiming that the relevant data, projections, etc., must be classified. This is the area I wish to address.	
DI-1	The initiative to increase production of plutonium was taken in 1980 after review of weapons stockpile needs by a high-level committee. Since then a great deal has happened that suggests that we will need less plutonium for new weapons than had been anticipated at that time and that more will be available from old weapons being retired from other sources. Specifically: 1. The programs for the MX missile and the air-launched cruise missile have been cut back. 2. The 1982 review of the ABM treaty has not resulted in any changes in the treaty and there is now no prospect of an early ballistic missile defense deployment. The Sentry ABM program has been cancelled. 3. The production of 155 mm artillery shells has been delayed.	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	4. A decision has been announced to withdraw 1400 nuclear warheads from Europe.	
DI-2	5. The Congress has refused to support continuation of the Clinch River Breeder program, which would have required large amounts of plutonium.	Requirements for the supply of fuel-grade plutonium to CRBR were not included in the determination of plutonium supply and demand in the Nuclear Weapons Stockpile Memoranda because this plutonium for CRBR would be obtained from sources outside the defense nuclear material complex. Material from sources under consideration (commercial spent fuel and purchases from foreign countries) would not be available to the weapons program because of existing law and restrictions expected to be imposed by the country providing the material. Furthermore (even if these restrictions did not exist), this plutonium could not be used for conversion to weapons-grade plutonium within a time frame that would affect the need for L-Reactor, because the Special Isotope Separation process is not expected to be available in 1990 and DOE has enough fuel-grade plutonium for blending during this period.
DI-3	With these changes there is not likely to be any need for reactivation of the L-Reactor in the near future, and possibly ever. In addition, any progress in arms control would very likely further reduce demand for plutonium. In this connection it should be noted that: 1. The concept of a "build down" of nuclear weapons requiring that two old warheads be given up for each new one acquired has gained increased acceptance, and a variant of it is now reflected in the President's arms control proposal - a variant that would require that the rate of retirement of strategic weapons be at least five percent per year.	See the response to comment DI-1 regarding the scope of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	2. The U.S. remains committed to giving up or limiting the deployment of intermediate range nuclear weapons in Europe if a suitable agreement can be reached with the Soviet Union. Finally, some of the nuclear weapons programs that would require new warheads that have been approved by the President can, and should be, seriously questioned. Examples are the MX and the enhanced radiation weapons, or neutron bombs.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	GEORGE WILLIAM RATHJENS Born June 28, 1925 in Fairbanks, Alaska Yale University, B.S., 1946 University of California, Ph.D. (Chemistry), 1951 Columbia University Instructor, Chemistry, 1950-1953 Weapons Systems Evaluation Group, Office of the Secretary of Defense, U.S. Department of Defense Scientific Advisor, 1953-1958 Harvard University Fellowship (Office of Naval Research), 1958-1959 Office of the Special Assistant to the President (Science and Technology) Member of the Staff, 1959-1960 Advanced Research Projects Agency, U.S. Department of Defense Chief Scientist, 1960-1961 Deputy Director, 1961-1962 United States Arms Control and Disarmament Agency Deputy Assistant Director, Science and Technology, 1962-1964 Special Assistant to the Director, 1964-1965 Institute for Defense Analyses Director, Weapons Systems Evaluation Division, 1965-1967 Director, Systems Evaluation Division, 1967-1968 Massachusetts Institute of Technology Department of Political Science, Visiting Professor, July 1968-July 1969 Department of Political Science, Professor, July 1969-present United States Department of State Deputy U.S. Representative for Non-Proliferation and Chairman, Management Committee for American Participation in the International Nuclear Fuel Cycle Evaluation, 1979-1980	

Comment number	Comments	Responses
	Dr. Rathjens graduated from Yale University in 1946 with a B.S. in Chemistry, and received a Ph.D. from the University of California in 1951, also in chemistry. He taught, and continued with research on molecular structure, at Columbia University from 1950-1953. He left Columbia University in 1953 to join the staff of the Weapons Systems Evaluation Group of the Department of Defense. With the exception of one year (1958-1959), during which he did research in physical chemistry at Harvard, he remained in Washington for the next 15 years in positions involving: the analysis of military research and development, and weapons acquisition programs; the development of national security policy, including arms control policy, in areas where technical problems were of importance; the administration of the work of others so involved and of military research and development programs.	

Comment number	Comments	Responses
	STATEMENT OF JOHN WINTHROP JOHN WINTHROP & CO., INC. 140 Broadway New York, New York 10005 (212) 480-9080 November 4, 1983 Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801 Dear Mr. Sires:	
DJ-1	As a landowner in South Carolina and as an American citizen, I am deeply concerned that the DOE facilities on the Savannah River and elsewhere be required to comply with all environmental standards applicable to commercial reactor sites. Furthermore, I hope I am correct in assuming that steps are being taken to avoid damage to the environment BEFORE startup. Please let me know if I can be helpful in furthering these important objectives. Sincerely yours, John Winthrop JW:ss	See the responses to comments BF-7 and BF-8 regarding the differences between SRP reactors and commercial light-water reactors, and the responses to comments AA-1, AA-3, and AF-2 regarding DOE's commitment to comply with all applicable Federal and state environmental protection regulations and to take all reasonable steps to mitigate impacts.

Comment number	Comments	Responses
	STATEMENT OF B. G. CLOYD BY W. H. RICE, JR. U.S. Department of Transportation Federal Highway Administration South Carolina Division Office 1835 Assembly Street Suite 758 Columbia, South Carolina 29201 November 8, 1983 Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P. O. Box A Aiken, SC 29801 Dear Mr Sires: Subject: Draft Environmental Impact Statement - "L-Reactor Operation, Savannah River Plant, Aiken, South Carolina" (DOE/EIS-0108D) Reference is made to the draft EIS and your letter of September 23, 1983. Thank you for the opportunity to comment on the document. We do not foresee any significant effect on the highway system as a result of the L-Reactor operation. We furnished a copy of the draft to the South Carolina Department of Highways and Public Transportation and inquired if they wished us to include any comments with our response. They advised they did not have any comment for us to include. Although we see no significant effect, we do list the following comments for your consideration:	
DK-1	Shipper's safety reliance rests primarily in packaging (DOT Specification) and in specially trained escort personnel. This is in keeping with usual procedures involving high risk transportation and appears adequate on its surface.	DOE complies with DOT packaging and escort regulations regarding the transportation of high-risk materials.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DK-2	Accident risk is hypothetical since there is no prior history of accidental release of material contained in Type B vessels.	DOE takes credit for the safety record of type-B vessels in their shipping procedures, and their safety and impact assessments.
DK-3	We would be more concerned with incoming shipments of flammable products such as gasoline. If outside vendors are used, what control is exercised to assure compliance with Title 49 over these vendors? Are cargo tanks routinely examined on entry to SRP? What controls are exercised in the off-loading of products? The statement is silent in this regard.	Agreements, contracts, or purchase orders issued by DOE or its prime contractor for vendor transport services include requirements to operate within all DOT and other agency regulations. The performance of these vendors is routinely monitored to assure compliance with requirements. DOE-SR and SRP implementation plans include procedures for proper identification and examination of all shipments, including cargo tanks, entering the SRP. These plans also include procedures for off-loading and handling of various classes of materials and containers commensurate with their potential hazard. These procedures are part of the general safety practices of the Plant, but include special procedures for handling and storing high-level materials.

Sincerely yours,

B. G. Cloyd
Division Administrator

By W. H. Rice, Jr.
District Engineer